

Oak Decline

Tennessee Department of Agriculture, Division of Forestry



Oak decline is a gradual weakening of the tree over several years followed by death. Outer branches die and leaves grow only near the trunk. Oak decline is not well understood but is thought to be a complex mix of tree age, site, location, weather, soils, fungi and insect attacks.

Oak decline is a normal part of ecosystem processes in aging upland hardwood forests. Dieback and death is an expected result when physiologically mature oaks come under stress.

Oak decline is weakening and killing increasing numbers of large mature oaks in Tennessee, especially the red oak group. During the latest forest survey period ending in 1999 5.2% of oak sawtimber died, much of it due to oak decline. Mortality for the 1989 survey, which included severe drought years, was 6.6%. This disease will become more common as these forests continue to mature.

Management Options – Short Term

Landowners have several options to promote healthy hardwood forests including oak. These can be customized to suit any forest, depending on the amount and distribution of dead and unhealthy trees.

Cut and sell declining red oaks and other oaks, especially red oak borer brood trees. Cutting these trees along traveled roads, trails or in recreation areas will reduce hazards to people.

Remove mid-story trees of less desirable competing trees to encourage growth of oak seedlings and saplings.

Cut small (approximately ½ acre) groups of trees. The combination of more sunlight striking the ground and possibly heavy acorn crops from stressed trees in small areas of severe oak decline can increase the number and success of oak seedlings.

Cut patches or whole stands where heavy decline and mortality are widespread, to give oaks a better opportunity to re-grow from stump sprouts and to give oak saplings the sunlight they need to thrive.

Use prescribed fire to encourage growth of oak seedlings in mature stands and to reduce the number of less fire-tolerant competitors.

Management Options – Long Term

For areas with less severe mortality/decline and areas that may be vulnerable to decline, the following options may be useful. Hazard rating systems (see the Continuum of Oak Decline Damage Potential chart below) can help identify vulnerability.

Improve the existing forest. Selectively cut smaller trees from the mid-story, thin the forest by cutting out some of the larger trees, and even use prescribed fire to develop oak seedlings and saplings. These treatments also reduce the number of less desirable

competitors. Where appropriate, cut red oaks in favor of quality stems of less susceptible trees like white oaks and hickory.

Start a new forest. Cut all trees in declining areas if there are enough well-distributed and well-developed oak saplings (10 feet tall) in the understory.

Low risk forests

Adequate growing-season moisture

No recent spring defoliation

Physiologically immature (Pole-size, <50 years old)

Mostly white oaks

“Rich” site (site index >70)

Mesic (moderate) site conditions

Loamy soils, few rocks

Deep (>18”) soils

Coves, terraces, bottoms, lower slopes

North and east aspects

High risk forests

Acute summer drought for 2-3 yrs

Recent spring defoliation

Physiologically mature (sawtimber, >50 years old)

Predominantly red oak group

“Poor” site (site index <70)

Xeric (dry) site conditions:

- ◆ Rocky soils
- ◆ Shallow (<18”) soils
- ◆ Ridges or upper slopes
- ◆ South and west aspects

Version 5-01